

1 1. For use in transforming colors between color
2 imaging systems, a color mapping method comprising:

3 using forward transformation profiles that
4 characterize the color imaging systems to generate
5 respective sets of device-independent color values for the
6 color imaging systems;

7 calculating color conversions by recursively
8 reducing differences between the sets of device-independent
9 color values; and

10 constructing a color map describing a relationship
11 between the color imaging systems using the color
12 conversions.

1 2. A color mapping method, according to claim 1,
2 further comprising recursively reducing differences between
3 black channel information.

1 3. A color mapping method, according to claim 1,
2 further comprising using an error function for calculating
3 the color conversions.

1 4. A color mapping method, according to claim 1,
2 further comprising configuring at least one of the profiles

3 to account for certain perceptual effects on color
4 appearance.

1 5. A color mapping method, according to claim 1,
2 wherein the color map comprises at least one of the
3 following: a lookup table, and an equation.

1 6. A color mapping method, according to claim 1,
2 further comprising:

3 storing the color map;
4 detecting respective types of color imaging
5 devices between which a color transformation is to be
6 performed; and
7 in response to the detected types, selecting a
8 stored color map.

1 7. For use in transforming colors between source
2 and destination color imaging systems, a color mapping
3 method comprising:

4 using profiles that characterize the color imaging
5 systems to generate device-independent color values for the
6 source color imaging system, the device-independent color

7 values having a same dimensionality as the source color
8 imaging system;

9 using the profiles to perform a color conversion
10 for converting the device-independent color values to
11 device-dependent values of the destination color imaging
12 system; and

13 using the color conversion to define a color map
14 for transforming colors between the color imaging systems.

• 1 8. A color mapping method, according to claim 7,
2 wherein the color conversion is performed at least twice.

1 9. A color mapping method, according to claim 7,
2 further comprising:

3 using the color conversion to evaluate its
4 accuracy at least once; and

5 revising the color conversion at least once to
6 improve its accuracy.

1 10. For use in transforming colors between source
2 and destination color imaging systems, a color mapping
3 method comprising:

1 (a) using profiles characterizing the color
2 imaging systems to generate device-independent color values
3 for the source color imaging system, the device-independent
4 color values having a same dimensionality as the source
5 color imaging system;

6 (b) using the profiles to perform a color
7 conversion for converting the device-independent color
8 values to device-dependent values of the destination color
9 imaging system;

10 (c) using the color conversion to improve the
11 accuracy of the color conversion relative to a quality
12 threshold;

13 (d) returning to step (c) until the color
14 conversion satisfies the quality threshold; and

15 (e) using the color conversion to define a color
16 map for transforming colors between the color imaging
17 systems.

1 11. For use in transforming colors between color
2 imaging systems, a color mapping arrangement comprising:
3 means for using forward transformation profiles
4 that characterize the color imaging systems to generate

5 respective sets of device-independent color values for the
6 color imaging systems;

7 means for calculating color conversions by

8 recursively reducing differences between the sets of device-

9 independent color values; and

10 means for constructing a color map describing a

11 relationship between the color imaging systems using the

12 color conversions.

1 12. For use in transforming colors between first

2 and second color imaging systems respectively using first

3 and second color coordinate systems, a color mapping method

4 comprising:

5 (a) generating first device-independent color

6 coordinates as a function of color coordinates in the first

7 color coordinate system;

8 (b) estimating preliminary color coordinates in

9 the second color coordinate system;

10 (c) generating second device-independent color

11 coordinates as a function of the preliminary color

12 coordinates;

13 (d) adjusting the preliminary color coordinates
14 to reduce an error between the first and second device-
15 independent color coordinates;
16 (e) returning to step (a) until the error
17 satisfies a quality threshold; and
18 (f) constructing a color map describing a
19 relationship between the first and second color imaging
20 systems as a function of the adjusted color coordinates.

1 13. A color mapping method, according to claim
2 12, further comprising using the color coordinates in the
3 first color coordinate system to estimate the preliminary
4 color coordinates.

1 14. For use in transforming colors between color
2 imaging systems, a color mapping arrangement comprising:
3 a computer arrangement, programmed to
4 use forward transformation profiles that
5 characterize the color imaging systems to generate
6 respective sets of device-independent color values for the
7 color imaging systems,

8 calculate color conversions by recursively
9 reducing differences between the sets of device-independent
10 color values, and
11 construct a color map describing a
12 relationship between the color imaging systems using the
13 color conversions; and
14 a memory, configured and arranged to store the
15 color map.

1 15. A color mapping arrangement, according to
2 claim 14, wherein the computer arrangement is further
3 programmed to use an error function for calculating the
4 color conversions.

1 16. A color mapping arrangement, according to
2 claim 14, wherein the computer arrangement is further
3 programmed to configure at least one of the profiles to
4 account for certain perceptual effects on color appearance.

1 17. A color mapping arrangement, according to
2 claim 14, wherein the computer arrangement is further
3 programmed to construct at least one of the following: a
4 lookup table, and an equation.

1 18. A color mapping arrangement, according to
2 claim 14, wherein the computer arrangement is further
3 programmed to

4 detect respective types of color imaging devices
5 between which a color transformation is to be performed, and
6 in response to the detected types, select a stored
7 color map.

1 19. For use in transforming colors between color
2 imaging systems, a data storage medium storing a computer-
3 executable program that, when executed,
4 uses forward transformation profiles that
5 characterize the color imaging systems to generate
6 respective sets of device-independent color values for the
7 color imaging systems;
8 calculates color conversions by recursively
9 reducing differences between the sets of device-independent
10 color values, and
11 constructs a color map describing a relationship
12 between the color imaging systems using the color
13 conversions.

1 20. A data storage medium, according to claim 19,
2 wherein the computer-executable program recursively reduces
3 differences between black channel information.

1 21. A data storage medium, according to claim 19,
2 wherein the computer-executable program uses an error
3 function for calculating the color conversions.

1 22. A data storage medium, according to claim 19,
2 wherein the computer-executable program configures at least
3 one of the profiles to account for certain perceptual
4 effects on color appearance.

1 23. A data storage medium, according to claim 19,
2 wherein the computer-executable program generates at least
3 one of the following: a lookup table, and an equation.

1 24. A data storage medium, according to claim 19,
2 wherein the computer-executable program:
3 stores the color map;
4 detects respective types of color imaging devices
5 between which a color transformation is to be performed; and

ADD A↓

6 in response to the detected types, selects a
7 stored color map.

09536366 - 0329000